GP38/SD40 Locomotive Operating Manual

Introduction

HP-Trainz introduces a new generation of locomotives for Trainz. We have incorporated the experiences of 12 years content creation for Trainz into the development. Besides the excellent appearance of the models we have focused our attention to an enhanced functionality of the locomotives. Choosing the functions we wanted to incorporate into our loco scripts, we focused rather on those that reflect the experience of an engineer and making the sessions driving more interesting, then on neat eye candies. This manual provides an overview of the functions of the locomotive and shows their operation.

You can observe the functions of the locomotive also in the following video:

Operating the GP38-2 Marias Pass HP-Trainz

Locomotive functions and effects

- Diesel fuel and sand consumption
- Weather conditioned driving physics
- Wiper management
- Cab functions
- Engine start/stop
- Working vigilance alerter
- Conductor/Speed supervision
- Enhanced sanding functions
- Auto running number
- Squealing brakes
- Head-of-Train Device ("Wilma")
- Animated sun visors
- Cab animation
- In-cab brightness follows the daylight
- In-cab illumination effects
- Dark cab in tunnel
- Squealing brakes
- Loco night effects

Locomotive setup

In surveyor you can enable/disable certain functions for each locomotive and set up the initial amount of fuel and sand.

GP38/SD40 Locomotive Operating Manual

Controls, Gauges, Indicators

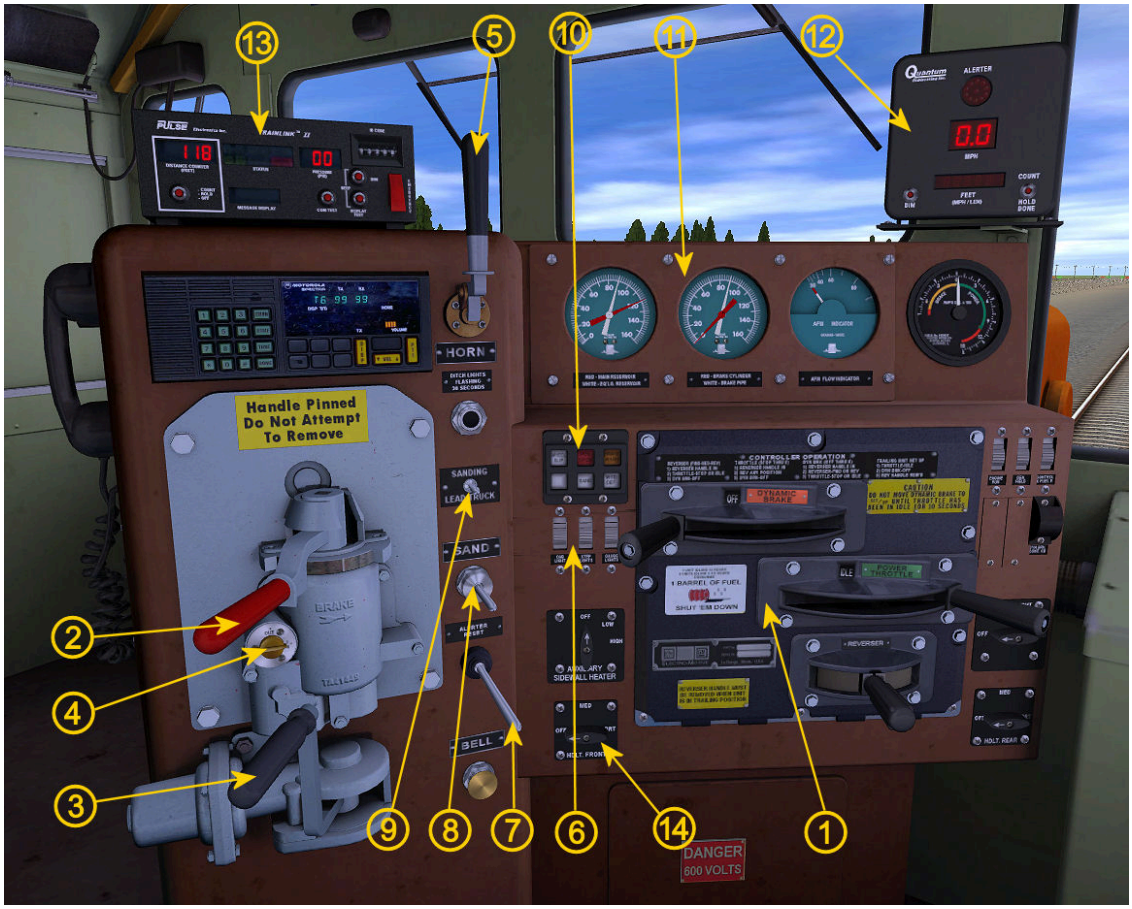

Fig. 1 Control stand

1. Controller
2. Automatic Brake Valve Handle
3. Independent Brake Valve Handle
4. Cutoff Valve*
5. Air Horn
6. Light Switches
7. Alerter Reset Switch
8. Sand Wobble Switch
9. Sanding Switch
10. Indicating Lights Panel
11. Gauges
12. Speed Recorder / Alerter
13. EOT Control Device ("Wilma")
14. Headlight Switch Front

* Can be moved but has not specific function yet

GP38/SD40 Locomotive Operating Manual

Controller Panel

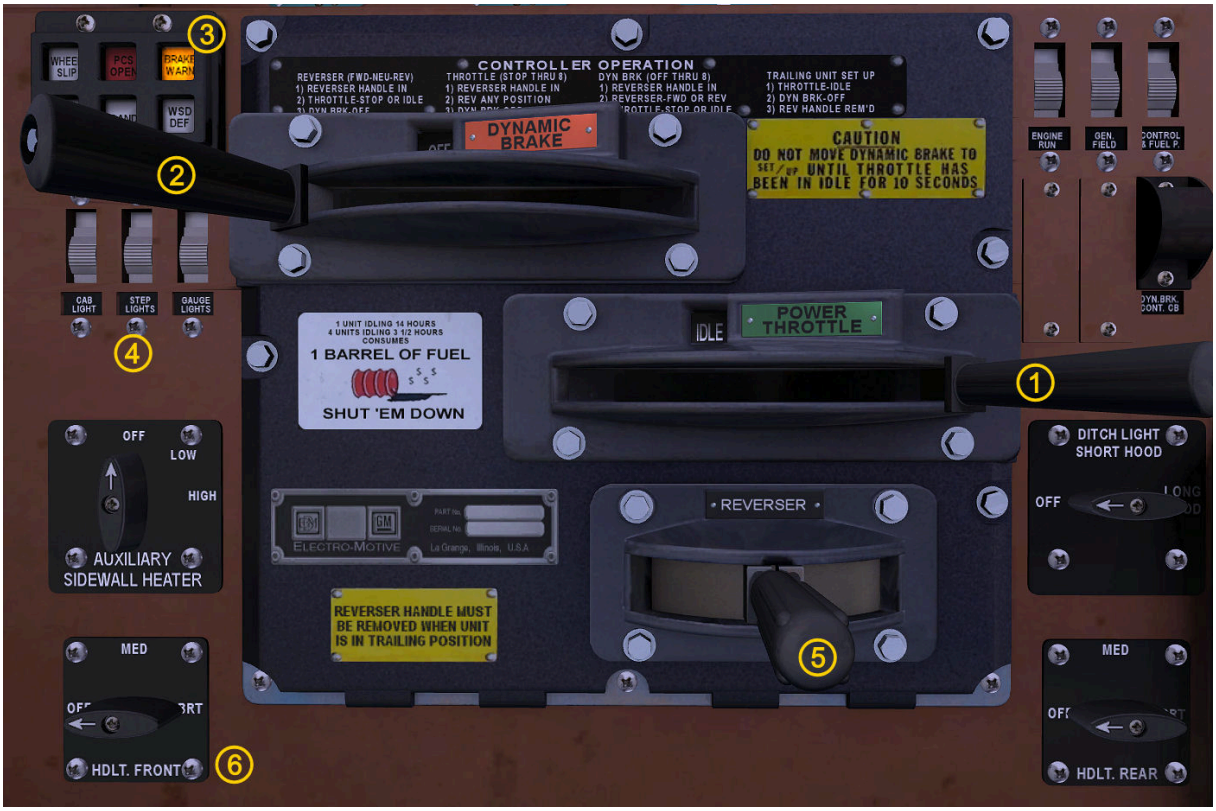

Fig. 2 Control Panel

1. Throttle Handle
2. Dynamic Brake Handle
3. Indicating Lights Panel
4. Light Switches
5. Reverser Handle
6. Headlight Switch

MECHANICAL INTERLOCKS ON THE CONTROLLER

The handles on the controller are interlocked so that:

- Throttle in IDLE position -
  a. Dynamic brake handle can be moved to any position.
  b. Reverser handle can be placed in forward or reverse position if dynamic brake handle is in OFF position.

- Throttle above IDLE position -
  a. Dynamic brake handle can not be moved.
  b. Reverser handle can not be placed in forward or reverse position.

- Dynamic brake handle in OFF position –
  a. Throttle can be moved to any position.
  b. Reverser handle can be moved to any position if throttle is in IDLE position.

- Dynamic brake handle moved out of OFF position -
  a. Throttle cannot be moved out of IDLE position into power positions.
  b. Reverser handle cannot be placed in forward or reverse position.

INDICATING LIGHTS PANEL

- **WHEEL SLIP Light**
  Indicates slipping wheels. (Differs from prototype function.)
- **PCS OPEN Light**
  Comes on to indicate a safety control or emergency air brake application. The pneumatic control switch PCS functions to automatically cut power to the traction motors in the event of a safety control or emergency air brake application.
  Locomotive power is restored by resetting of the PCS switch. This occurs automatically, provided that:
  1. Control of the air brake is recovered.
  2. The throttle is returned to IDLE position.
- **BRAKE WARN Light**
  Indicates the application of any brake.
  (Differs from prototype function. There it indicates excessive dynamic braking current.)
- **SAND Light**
  Indicates the "SANDING" state
- **WSD DEF Light**
  Currently no function

LIGHT SWITCHES

- **Gauges lights switch**
  Turns the display illumination on/off
- **Cabin light switch**
  Turns the cabin interior lights on/off
- **Step lights switch**
  Turns the outside step and walkway lights on/off

Just click with the moue onto the switches. You don't need to drag the mouse.

HEADLIGHT SWITCH

Controls the headlights of the loco. Has three positions Off/Medium/Bright. The switching between front/rear lights occurs automatically in

Engine start/stop

This is probably the first thing you need to know (unless you have already started the engine in Surveyor). There are two ways to start the engine:

The "engineers" way

- Enter the cab.
- Press the "]" key twice to focus the camera on the rear control panel.

Fig. 3 Rear Control Panel

- Set the switch α into the "Start/Stop/Isolate" position
- Move the switch β into the "Fuel Prime" position moving it up with the mouse (Optional step, only sound effect)
- Move the switch β into the "Engine Start" position moving it down with the mouse. You will hear the starting sound. Wait until the engine is idling steady.
- Set the switch α into the "Run" position. (Omitting this step, the engine will run but is electrically isolated from the controller. Moving the throttle will have no effect).
- To stop the engine, click with the left mouse button (LMB) on the button χ . The engine will shut down (takes few seconds). The engine doesn't consume fuel now.

This way start only the individual engine. Having more engines in the consist, you have to repeat the procedure for each loco.

The quick and easy way

Press the "1" key on the keypad (KP1). All engines in the consist will start now. The first time in the session, you have to press KP1 twice. To stop all engines in a consist, press KP1 again.

Speed Recorder / Alerter

Vigilance alerter is a device, which is designed to prevent accidents caused by fatigue or incapacity of the driver. The alertness of the engineer is checked when he has shown no activity during a fixed time period. Shows the engineer no response to the graduated alarm, the train will stop automatically. Nowadays most U.S. locomotives are equipped with such devices.

Fig. 4 Speed Recorder / Alerter

ALERTER OPERATION

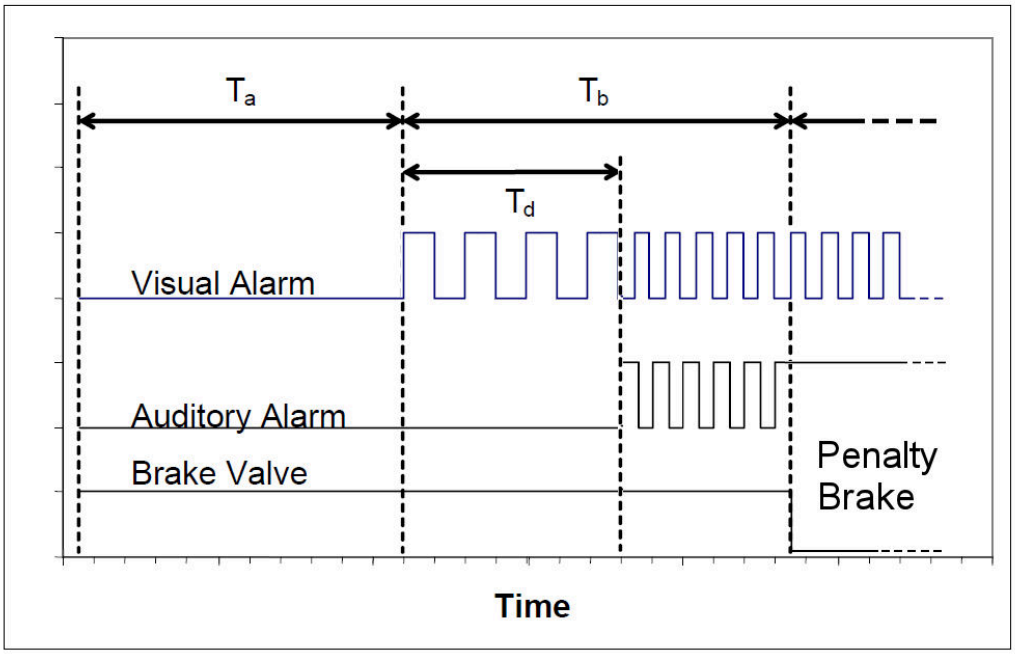

Fig. 5 Alerter Timing Diagram

The alerter is preemptive (you can reset it any time, don't need to wait until alarm is displayed) and activity based (operating throttle or dynamic brake resets the alerter). The alerter is only active if train is moving.

Fig. 5 shows the alerter timing. If the driver does not reset the alerter within the time period Ta + Tb a penalty brake will be launched. Ta = 60 sec, Tb = 25 sec, Td = 15 sec. The alerter can be reset:

a. clicking on the Alerter Reset switch (γ in Fig.1)
b. operating the throttle or dynamic brake
c. pressing alt+space on the keyboard

The alerter resets automatically on complete train stop.

If you are driving in an outside camera mode, you cannot watch the alerter. You will get a warn message instead.

Canceling of penalty brake:

- Reset alerter
- Set throttle lever to idle position
- Release the train brake
- Wait until the red PCS OPEN lamp goes out . The locomotive power is restored now.

You can enable/disable the alerter in driver module checking the box in View Details window. See Fig. 8.

Conductor/Speed supervision

Fig. 6 Conductor

This locomotive has an optional conductor with speed supervision function. If enabled (in surveyor), the conductor will warn you when you are driving more the 5 MPH over speed limit. If you are still speeding after the second warning, he will apply the emergency brake. Once the speed drops below the speed limit, he will close the emergency brake valve. You can cancel the emergency brake application releasing the train brake and setting the throttle to the idle position. Once the red PCS OPEN light goes off, the throttle gains efficiency again.

If you are driving in an outside camera mode, you cannot watch and hear the conductors warning. You will get a (cascaded) warn message instead.

Weather conditioned driving physics

In dry weather the adhesion between wheel and rail is good, the locomotive can develop full tractive effort. On start-up's, nevertheless you shouldn't engage the top throttle notch immediately (according to the weight in tow), to avoid wheel slip.

In humid weather and rain the locomotive inclines a lot rather to wheel slipping, with snow and ice the adhesion gets worse even more. You have to handle the throttle very carefully on start-up and make use of sand, when required. Do not forget, to switch off sanding if not more needed, otherwise you will soon finish with empty sand boxes.

Sanding

Use sand when the wheels are slipping. There are 2 sand switches. They are now fully functional and have different effects. The short one "SANDING LEAD TRUCK" has a switch function and causes normal, continuous sanding. (The same function as KP- on the keyboard). The traction boost when wheel slip occurs is 40%. The longer sand wobble lever "SAND" has a spring function (button) and causes a traction boost off 80%, sanding all trucks. When pressed down, the sand consumption rate will double. It is handy on heavy start up's.

Fig. 7 Sand switches and lights

Diesel fuel and sand consumption

The locomotive consumes diesel fuel, depending on the throttle position. When idling a lower fuel amount is consumed. Also consumes sand when sanding. If the fuel level falls under 10%, a warning message is given. With empty tank the locomotive develops no more tractive effort and shuts down. It has eventually to be towed off to the next filling facility by a helper loco. With empty sand box sanding shows no effect. The loco can be refilled in a suitable tank and sand facility (if available on the route). You can check any time the still remaining fuel and sand amount, pressing the CTRL key and clicking with the right mouse button on the locomotive, and selecting "View Details" (in the driver's module).

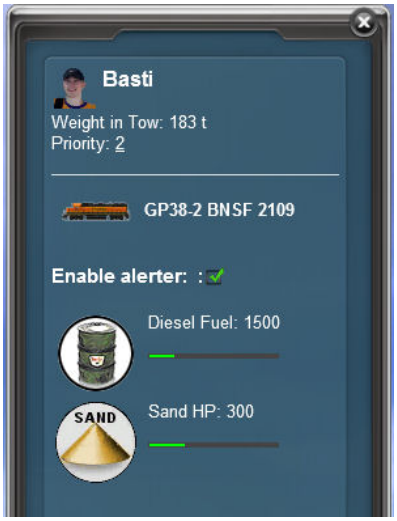

Fig. 8 View Details Window

Windshield wiper control

If you control the locomotive yourselves, you are responsible as a train driver for the function of the windshield wipers. (Controls valves for front and rear wipers are in the cabin - Fig. 9). The outside visible windshield wipers follows the wipers in the cabin.

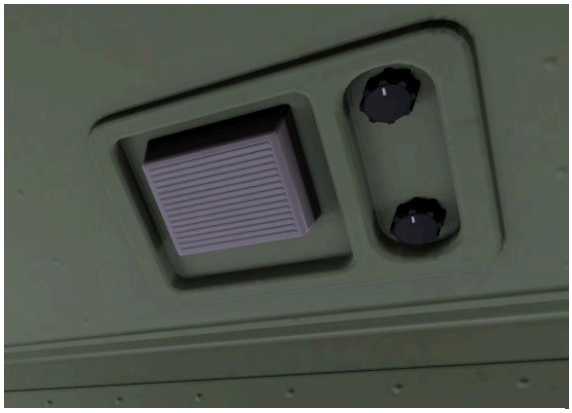

Fig. 9 Windshield wiper valves

The wipers can be alternatively switched on/off via keyboard (alt+comma on, each other keystroke toggles between slow/fast motion. alt+period off). Affects only front windshield wipers. You can control the wipers also outside of cab.

In the AI mode the windshield wipers of the leading locomotive are automatically controlled according to weather condition. With ongoing rain, these starts moving after a short time, on storm and heavy rain they switch in the quick speed. The windshield wipers of all other locomotives in the consist remains inactive.

Remark: during the loading process in a station or in an industry the train is always in the AI mode.

Other functions and effects

Auto running number

When placed in surveyor, the locomotive automatically gets assigned an unique RN. The RN can be changed manually. The current RN is displayed on the front cabin wall.

Head-of-Train Device ("Wilma")

It is the counterpart of FRED (Flashing Rear-End Device). Among railroaders known as a "Wilma." (This is a play on the first name of the wife of cartoon character Fred Flintstone.) The two devices are radio linked. The main purpose of the "smart" ETD (End Of Train Device) is the monitoring of train integrity and brake line pressure. It also contains a toggle switch used to initiate an emergency brake application from the rear end. (FRED is connected to the brake pipe.) The widespread use of ETD's has made the caboose nearly obsolete.

Fig. 10 "Wilma"

Our virtual "Wilma" displays the current train length (feet) and the brake pipe pressure (PSI).

Sun visors

There are 2 of them, animated, you can move them by dragging with the mouse.

Cab animation

The cabin has animations which are speed dependent. The primary animation simulates the sine run plus some sway and vertical shaking. On top of this is there a vertical shaking when passing a junction.

In-cab brightness

The brightness of the cab interior follows the daylight. In the late afternoon it will softly get darker, stays dark the whole night and gets slowly bright in the morning.

Fig. 11 Night cab

There are some illumination effects in the dark cab:

Gauges lights

turn them on with the switch

Cab interior light

When switched on the cab brightness rises and the flares around the interior lamps appears. In addition, the cabin from the outside view appears illuminated.

Step lights

Switch the walkway and step lights on with the respective flip switch on the control panel. The lights are visible outside.

Outside view cameras

There are three outside view cameras in the cab. Right and left cab window view and a position on the rear platform.

Dark cab in tunnel

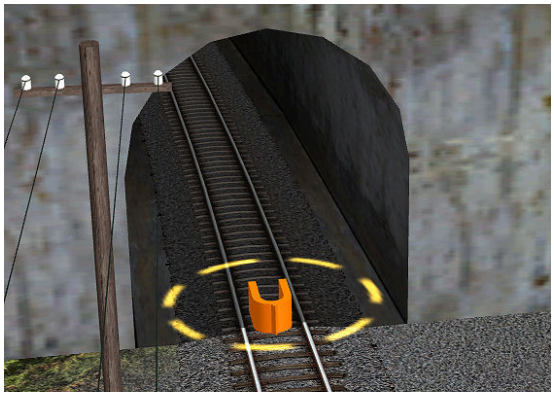

Fig. 12 Tunnel end trigger

When you enter a tunnel the cabin will be dimmed, it returns to the current daytime brightness when leaving the tunnel. This works with all spline assets Trainz recognizes as tunnel. This has one flaw. Trainz detects the end of tunnel when the middle of the vehicle is out of tunnel. The cab is already on the daylight when starting to brighten. Looks a bit weird. To make the effect looking perfectly, we have build a special unidirectional trigger which messages the cab leaving tunnel short before the end of tunnel. Place the tunnel trigger just on each end of a tunnel (it has a trigger radius of 20m), the "tooth" of the trigger object pointing out of tunnel. The show will be perfect now. The tunnel trigger is packaged with the loco.

Squealing brakes

If you stop with brake cylinder pressure higher than 15 psi, you will hear the sound of squealing brakes bellow 8 mph. The sound stops when releasing the brakes or when the train stops.

Loco night effects

- Back lighted number plates (switchable with the headlights at night only)
- Step and walkway lights (switchable from cab)
- Flashing ditch lights (";" key)